GOSSEN METRAWATT

SMART**CONTROL** | ECS

Energy Management System
Input/Output Module for 24 Channels

3-349-552-03
1/10.09

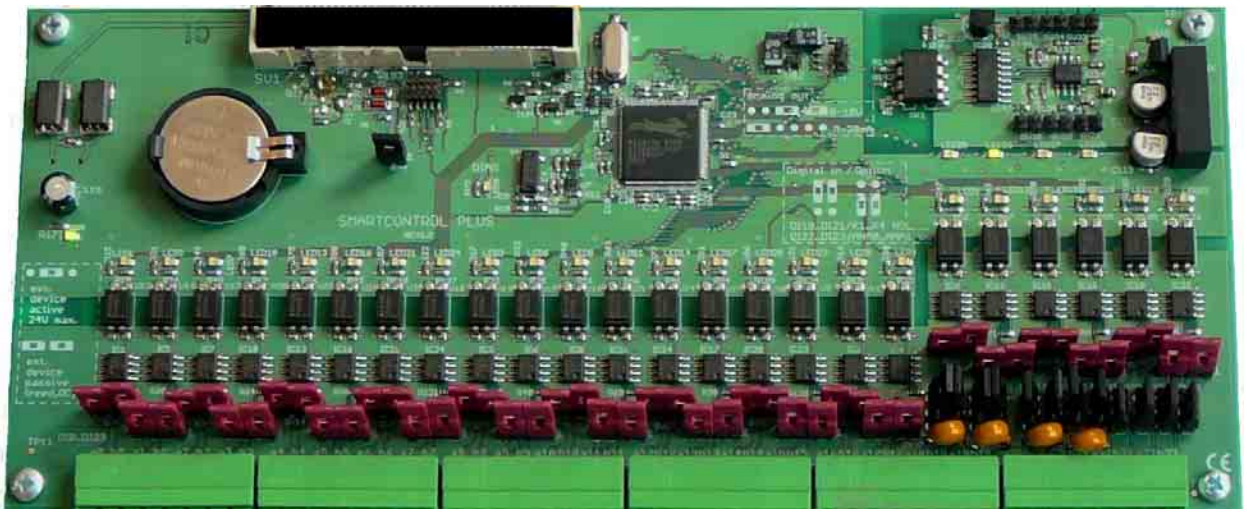
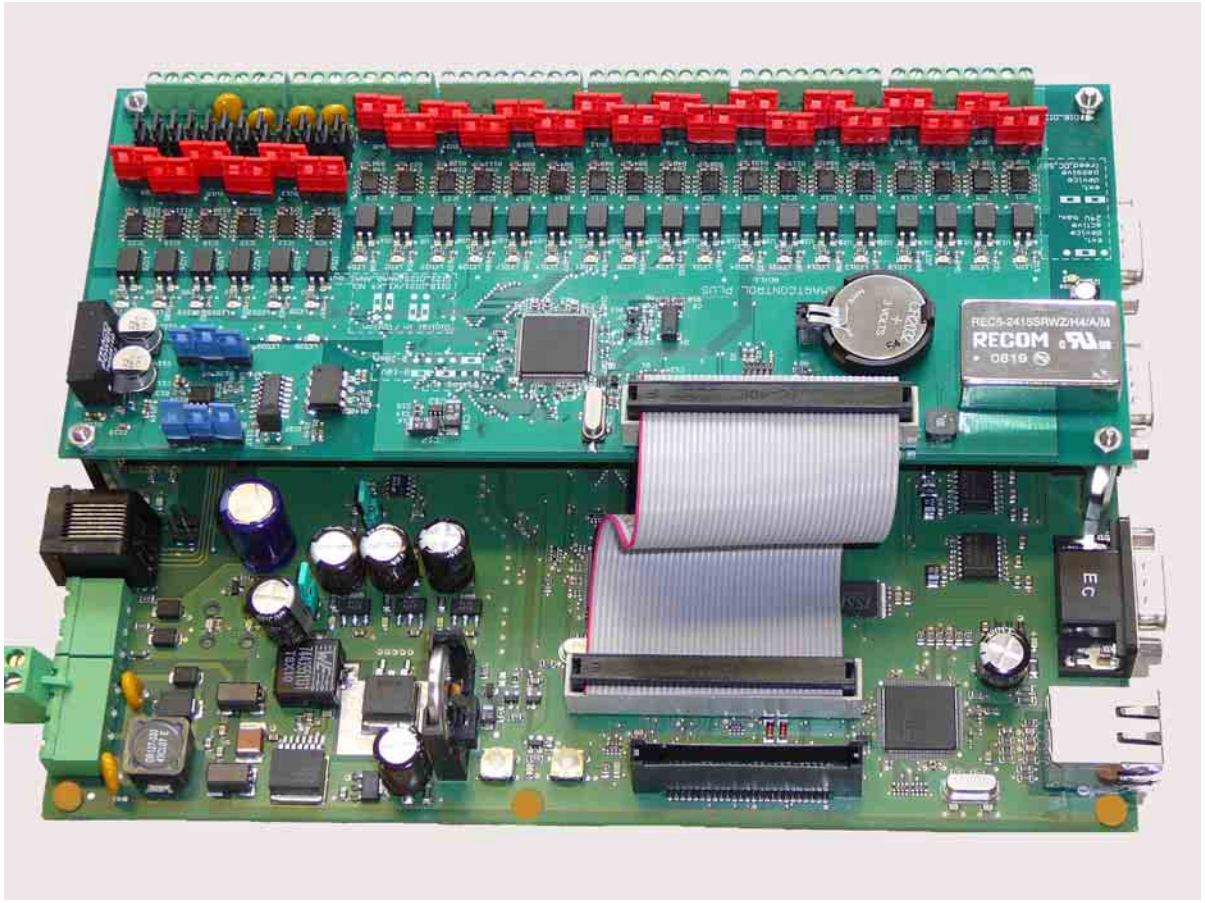


Table of Contents

1. Input/Output Module for 24 Channels 3
1.1 Jumper Designations and Functions..... 4
2. Input/Output Module for 24 Channels and SmartControl Manager 7
2.1 Command Type IO24Analog..... 8
2.2 Command Type IO24Meter..... 10
2.3 Command Type IO24Relay..... 10
2.4 Command Type IO24Status..... 11
2.5 Backup Battery 13
3. Characteristic Values 14
4. Repair and Replacement Parts Service, Calibration Center and Rental Instrument Service 16
5 Product Support..... 16

1. Input/Output Module for 24 Channels

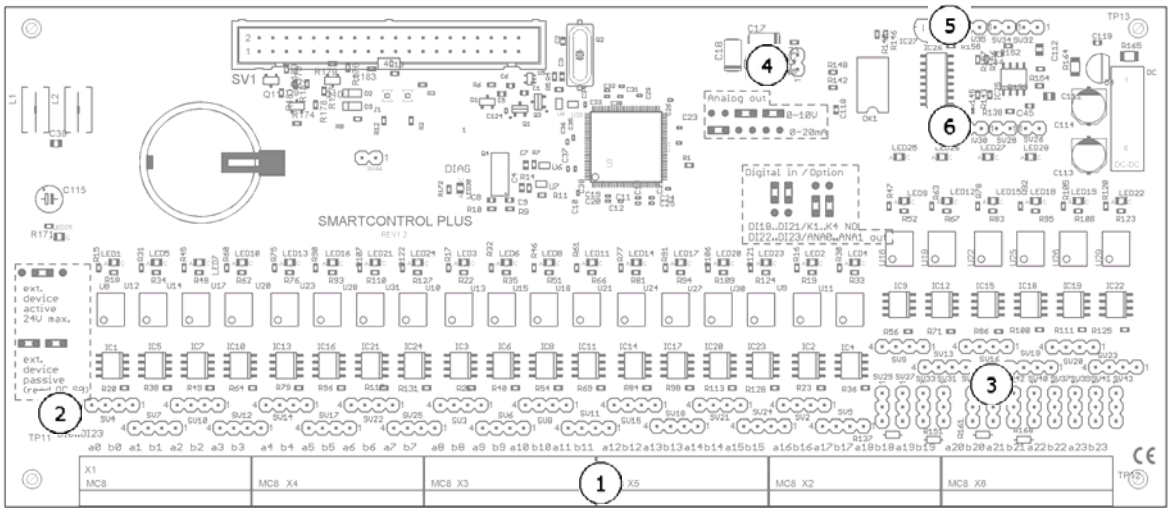
The I/O module for 24 channels expands the SmartControl with 24 additional digital inputs (DI0 through DI23).
Furthermore, ports DI18 through DI21 can be configured as switching outputs K1 through K4 by means of jumpers. Ports DI22 and DI23 can be configured as analog outputs with jumpers as well.



The module is mounted with the help of the included accessories, and is connected to the expansion port at the SmartControl PCB (at the bottom in the picture) with the included cable.

Please observe all safety precautions for assembly and the connection of ports included in the SmartControl user's manual.

1.1 Jumper Designations and Functions



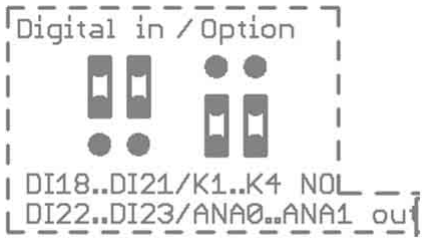
(1) The terminals for ports DI0 through DI23 are designated a and b. The terminals for the digital inputs, for example DI0, are designated a0 and b0.

(2) Jumpers for the active or passive digital input mode: If the ports are used as digital inputs, either sensors with their own power supply or, e.g., floating contacts/reed contacts can be connected. For a more detailed description of this function please refer to the "*Digital Inputs*" section in the SmartControl user's manual. However, the digital input tariff and synchronization functions described in the user's manual are not available in this case.

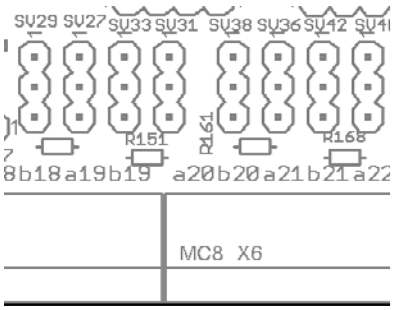
Digital in / option:

(3) Jumpers for selecting options for the last six digital inputs (DI18 through DI23).

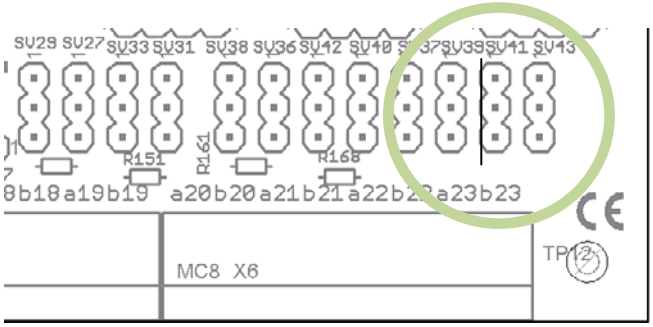
Ports DI18 through DI21 can be configured as switching outputs K1 through K4. For example, SV27/SV29 plugged onto 2-3,respectively, configures DI18 as floating NO contact K1.
For a more detailed description of the relays please refer to the "*Analog Inputs, Relays*" section in the SmartControl user's manual.



The jumpers required for selecting switching outputs K1 through K4 are:
SV29/SV27, SV33/SV31, SV38/SV36, SV42/SV40.



The following are then available at the terminals, for example for DI18 as switching output K1:
DI18a and DI18b, the switching function is configured as a normally open contact (NO).
Ports DI22 through DI23 can be configured as analog outputs.
The jumpers required for selecting analog outputs ANA0 through ANA1 (command address: 0-1) are:
SV37/SV39, SV41/SV43.



Function selection for the analog outputs:

Required jumpers for ANA0 -> SV30 SV28 SV26

Required jumpers for ANA1 -> SV35 SV34 SV32

Example ANA0 as 0-10V output -> Jumper plugged onto SV28, SV26.
The following are then available at the terminals for DI22:
DI22a analog plus (+)
DI22b analog ground (-)

Example ANA0 as 0-20mA output -> no jumper plugged onto SV30, SV28, SV26
The following are then available at the terminals for DI22:
DI22a analog plus (+)
DI22b analog ground (-)

The following combinations are possible for both analog outputs:

ANA0	ANA1	Use
0-10V	0-10V	Common ground
0-20mA	-	Common ground
-	0-20mA	Common ground
0-20mA	0-20mA	Electrical isolation required
0-10V	0-20mA	Electrical isolation required
0-20mA	0-10V	Electrical isolation required

Within this context, electrical isolation means, for example, that the ground terminals at ANA0 and ANA1 are neither connected with each other nor with any external ground terminals.

Further components:

Jumper SV44 (always plugged in) disconnects the reset cable from the main PCB.
Briefly unplugging the jumper results in a reset.

Jumper SV45 (always open) is used to reinitialize the BBSRAM.

LEDs 1 through 24 (red): indicates pulses at inputs DI0 through DI23.
LED 30 (green) DIAG, blinks approx. once per second for normal operation.

LEDs 25 through 28 (green): status display for the switching outputs
LED on = contact closed
LED off = contact open

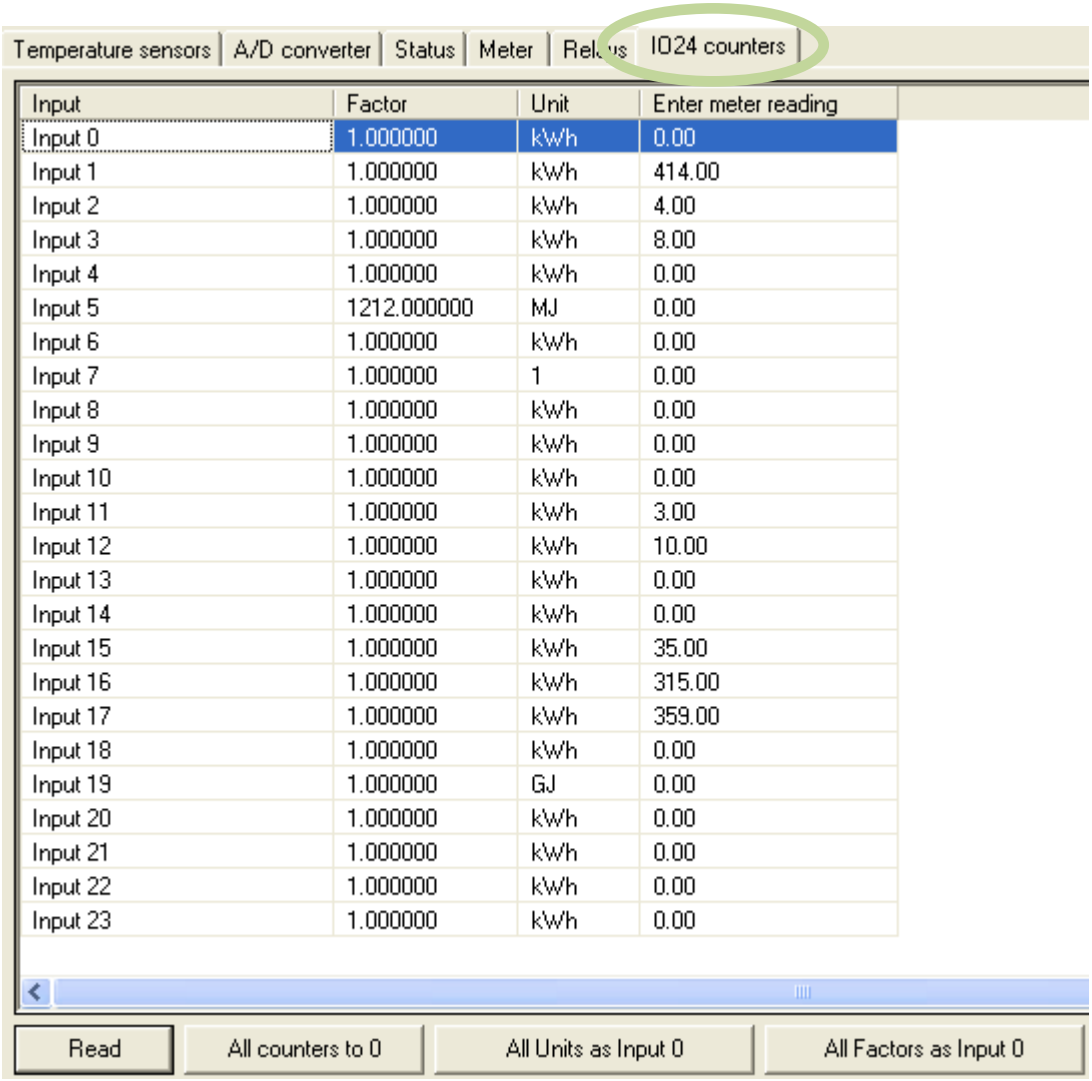
SV1 is the interface to the main PCB at the SmartControl (expansion port).

The jumpers for active and passive inputs correspond to those of the SmartControl (refer to the "*Digital Inputs*" section in the SmartControl user's manual).
The connection terminals for DI0 through DI23 are numbered 49 through 96.

2. Input/Output Module for 24 Channels and SmartControl Manager

The input/output module for 24 channels is configured with SmartControl Manager software.

The "IO24Meter" spreadsheet can be accessed under calibration in the SmartControl Manager:



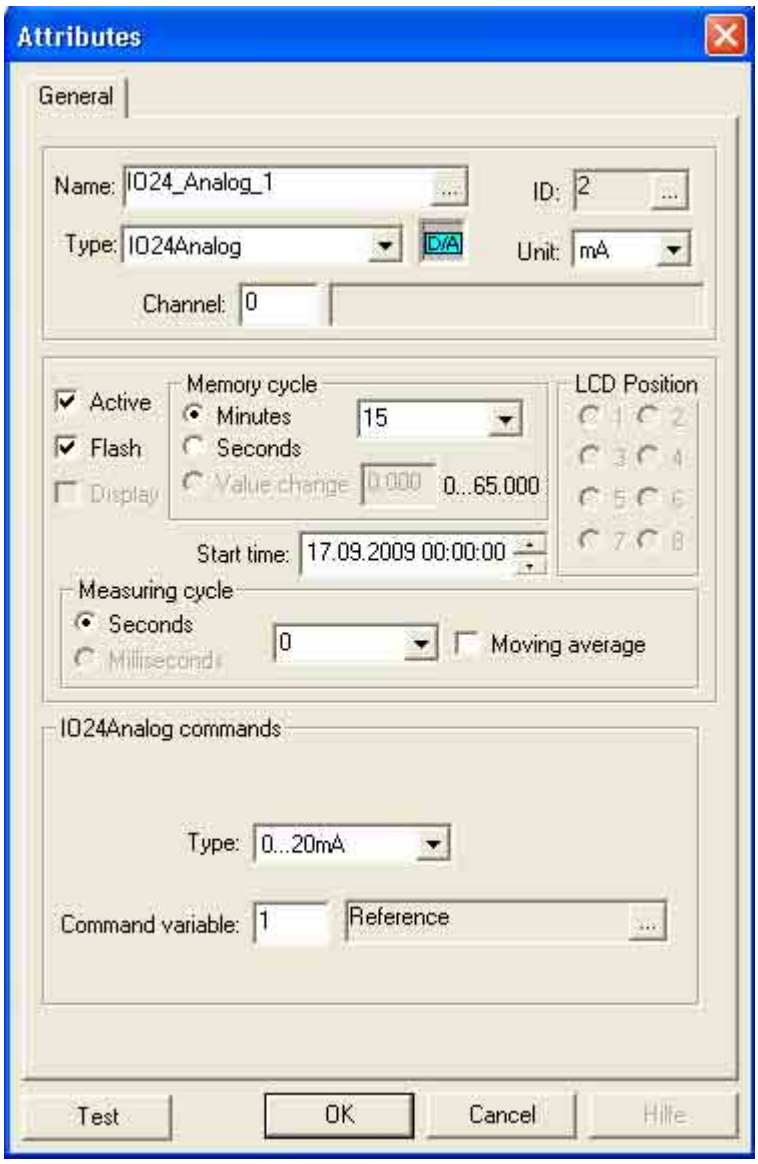
Input	Factor	Unit	Enter meter reading
Input 0	1.000000	kWh	0.00
Input 1	1.000000	kWh	414.00
Input 2	1.000000	kWh	4.00
Input 3	1.000000	kWh	8.00
Input 4	1.000000	kWh	0.00
Input 5	1212.000000	MJ	0.00
Input 6	1.000000	kWh	0.00
Input 7	1.000000	1	0.00
Input 8	1.000000	kWh	0.00
Input 9	1.000000	kWh	0.00
Input 10	1.000000	kWh	0.00
Input 11	1.000000	kWh	3.00
Input 12	1.000000	kWh	10.00
Input 13	1.000000	kWh	0.00
Input 14	1.000000	kWh	0.00
Input 15	1.000000	kWh	35.00
Input 16	1.000000	kWh	315.00
Input 17	1.000000	kWh	359.00
Input 18	1.000000	kWh	0.00
Input 19	1.000000	GJ	0.00
Input 20	1.000000	kWh	0.00
Input 21	1.000000	kWh	0.00
Input 22	1.000000	kWh	0.00
Input 23	1.000000	kWh	0.00

Factor, unit of measure and meter reading can be entered. These entries are written to the SmartControl after clicking the "Accept" button, and all entries can be returned to their default values by clicking the "Reset" button.
Click the current reading for setting the meter readings. Change the reading and acknowledge with enter. Save the changes to the SmartControl with the button „..." which then appears.

The units of measure entered here are used automatically when the meters are read.
Units of measure and meter factors can only be changed here.
One of the following IO24 commands can now be entered to a new program in the SmartControl Manager under menu item "programming":

The symbols are located in the middle at the top of the main window.
Just click the symbols and drag them to an empty command field. "D/A" means analog, "123" means meter, the third symbol represents a relay, "I/O" means status.

2.1 Command Type IO24Analog

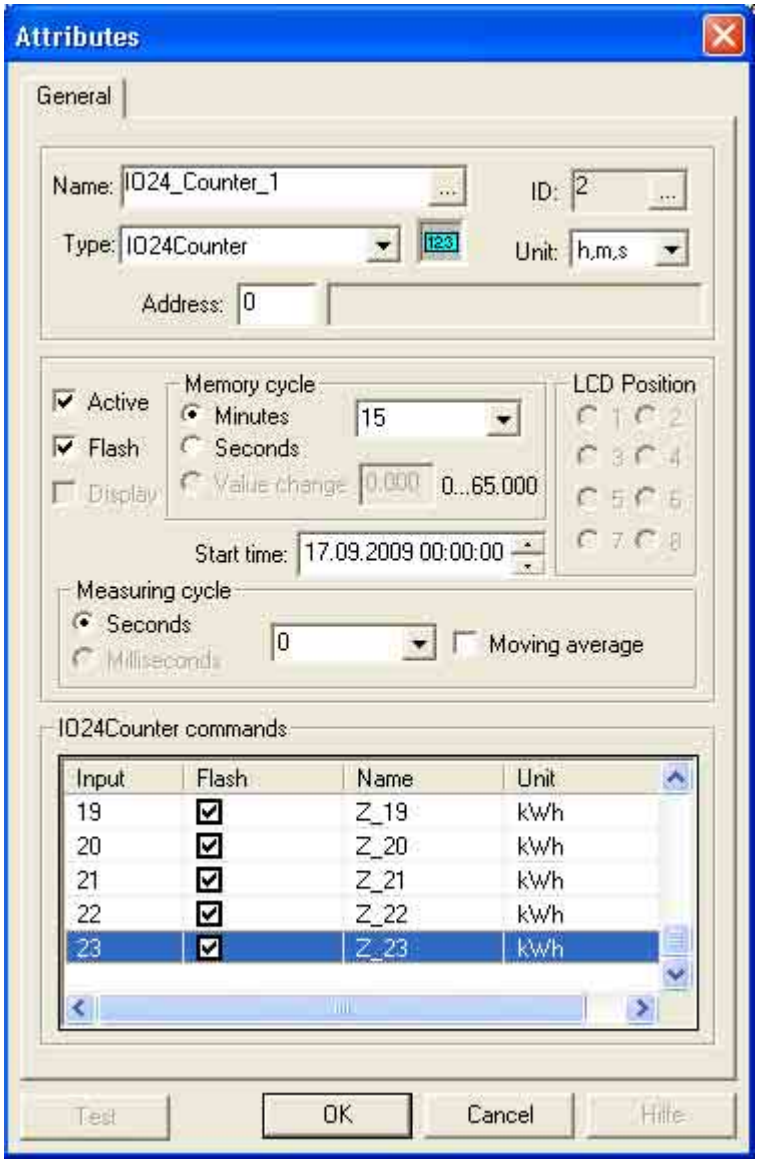


The address determines the output channel (ANA0=0 or ANA1=1).
The command variable determines the analog output value. Any desired reference can be used.

Only analog values within the output range are displayed. Larger and smaller values are shortened accordingly.
Example: the command variable has the value 15, whereas the value 10 is shown as analog value.
The value range of the input value can be further adjusted to the output range by adjusting the slope, etc. of the command variable.

By clicking „Test" a window opens. Upon entering a test value and clicking the "Start" button, the analog output is set to the corresponding value. If no test value is entered, the command variable is used.

2.2 Command Type IO24Meter



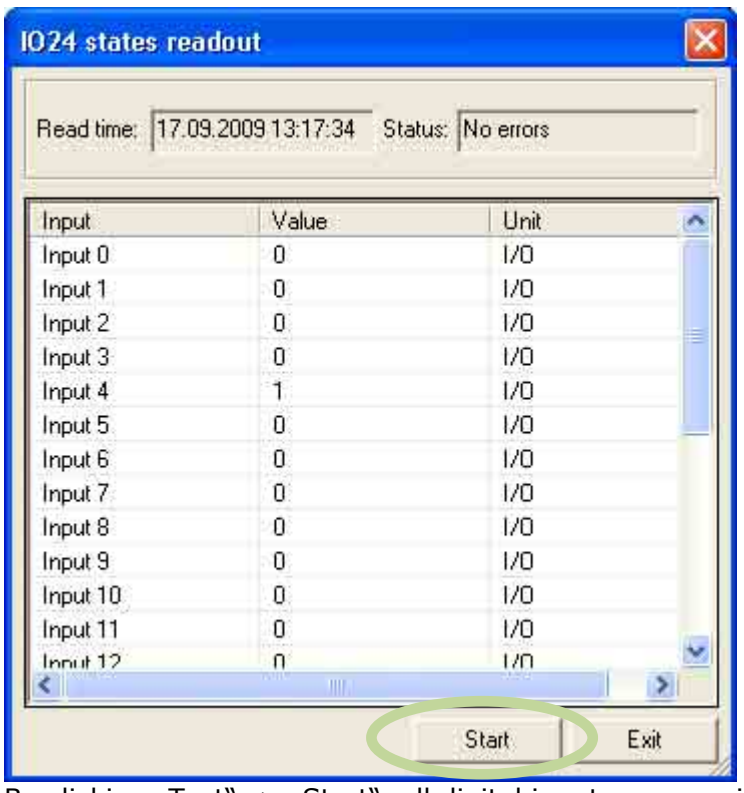
The name can be changed in the bottom field in the meter command, and selection can be made as to whether or not writing to flash memory will take place.
Furthermore, it can be specified for each input whether or not this value will be stored to flash memory.
Attention: If changes are made here (clear or add meter, or use another input), another ID is assigned to the data as of this point in time which must be given special consideration during read-out because the configuration of the data has been changed!
Further settings, for example unit of measure, can be entered under "Calibration" -> "IO24Meter".

2.3 Command Type IO24Relay

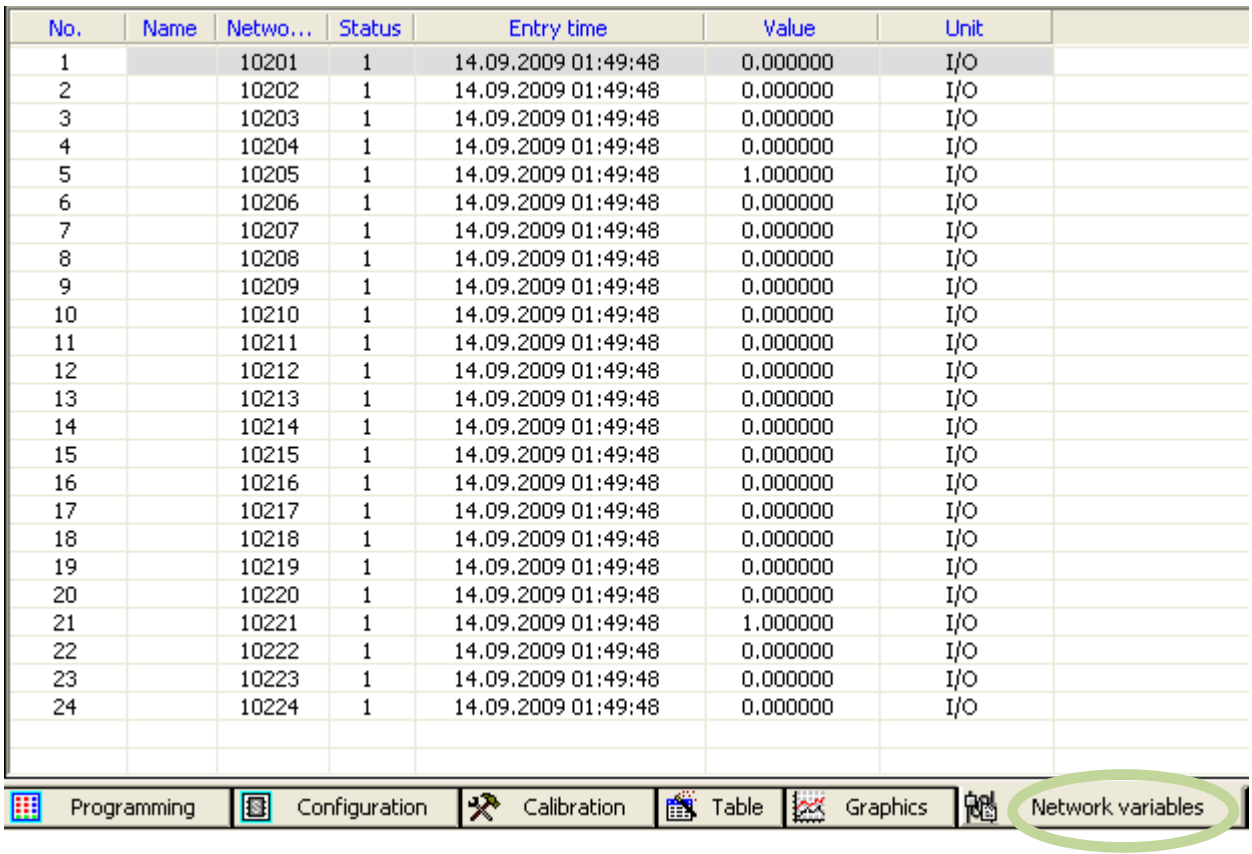
Please refer to the "*SmartControl Manager, Command Type Relay*" section in the user's manual for the SmartControl with regard to this command type.
The functions are the same, only the addresses for DI18 through DI21 in the address field of this command type are 0-3.

2.4 Command Type IO24Status

An IO24 status command can be created for recording status changes.
The status command queries all digital inputs at the clock-pulse rate of the measuring cycle.
The address field has no significance in this case.
Status changes are saved at the clock-pulse rate of the **measuring** cycle at most. However, data are always saved at the clock-pulse rate of the **saving** cycle, regardless of whether a status change has taken place or not.



By clicking „Test" -> „Start", all digital inputs are queried.



No.	Name	Netwo...	Status	Entry time	Value	Unit
1		10201	1	14.09.2009 01:49:48	0.000000	I/O
2		10202	1	14.09.2009 01:49:48	0.000000	I/O
3		10203	1	14.09.2009 01:49:48	0.000000	I/O
4		10204	1	14.09.2009 01:49:48	0.000000	I/O
5		10205	1	14.09.2009 01:49:48	1.000000	I/O
6		10206	1	14.09.2009 01:49:48	0.000000	I/O
7		10207	1	14.09.2009 01:49:48	0.000000	I/O
8		10208	1	14.09.2009 01:49:48	0.000000	I/O
9		10209	1	14.09.2009 01:49:48	0.000000	I/O
10		10210	1	14.09.2009 01:49:48	0.000000	I/O
11		10211	1	14.09.2009 01:49:48	0.000000	I/O
12		10212	1	14.09.2009 01:49:48	0.000000	I/O
13		10213	1	14.09.2009 01:49:48	0.000000	I/O
14		10214	1	14.09.2009 01:49:48	0.000000	I/O
15		10215	1	14.09.2009 01:49:48	0.000000	I/O
16		10216	1	14.09.2009 01:49:48	0.000000	I/O
17		10217	1	14.09.2009 01:49:48	0.000000	I/O
18		10218	1	14.09.2009 01:49:48	0.000000	I/O
19		10219	1	14.09.2009 01:49:48	0.000000	I/O
20		10220	1	14.09.2009 01:49:48	0.000000	I/O
21		10221	1	14.09.2009 01:49:48	1.000000	I/O
22		10222	1	14.09.2009 01:49:48	0.000000	I/O
23		10223	1	14.09.2009 01:49:48	0.000000	I/O
24		10224	1	14.09.2009 01:49:48	0.000000	I/O

Programming | Configuration | Calibration | Table | Graphics | Network variables

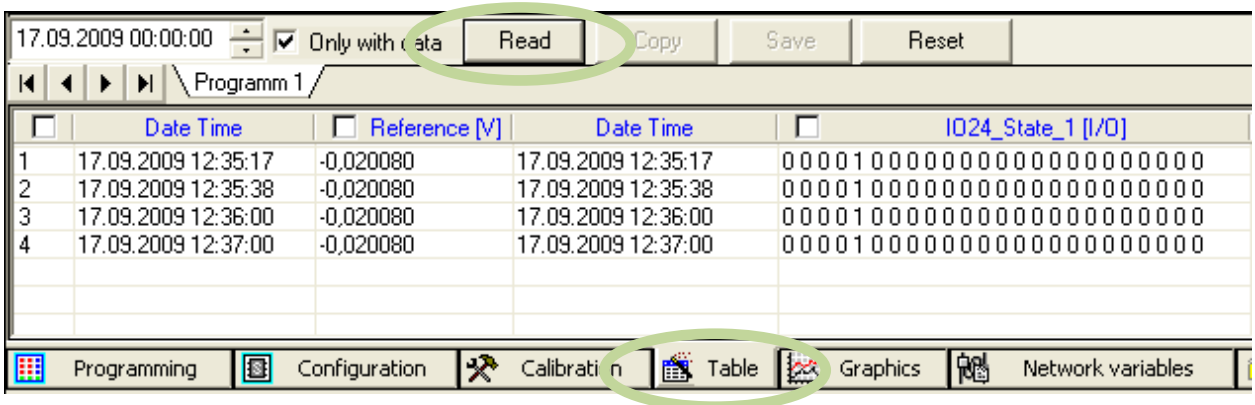
The digital inputs under the network ID are individually available under menu item „Network Variables" and can be used for example as reference for system commands.

The „Network Variables" are automatically created with pre-defined values by the SmartControl under „IO24" commands. They are automatically assigned a new virtual ID which is calculated as follows::

Virtual ID = 10,000 + ID of the IO24 command x 100 + No. value.

Example for the IO24 status command of digital input 12:

Virtual ID = 10,112 = 10,000 + 1 x 100 + 12



	Date Time	Reference [V]	Date Time	IO24_State_1 [I/O]
1	17.09.2009 12:35:17	-0,020080	17.09.2009 12:35:17	00001000000000000000000000
2	17.09.2009 12:35:38	-0,020080	17.09.2009 12:35:38	00001000000000000000000000
3	17.09.2009 12:36:00	-0,020080	17.09.2009 12:36:00	00001000000000000000000000
4	17.09.2009 12:37:00	-0,020080	17.09.2009 12:37:00	00001000000000000000000000

Programming | Configuration | Calibration | Table | Graphics | Network variables

The values which have been saved to memory can be queried under menu item „Table" -> „Read-in".
The status of the other inputs is also saved by this command for channel 12.

2.5 Backup Battery

The battery on the PCB is a lithium round cell, type CR2032 3V.
It serves to maintain the meter readings in the event of a power failure.
If the instrument is stored for a lengthy period of time without being used, we recommend replacing the battery every 2 years.
In the case of permanent operation, we recommend replacing the battery every five years.
Please supply the instrument with mains power during battery replacement in order to avoid the loss of data. Please be careful in the process, do not remove any cables and do not connect the two poles of the battery holder with each other.

3. Characteristic Values

Input/Output Module for 24 Channels	
Dimensions (W x H)	Approx. 216 x 96 mm
Power consumption *	Max. 10 W

Digital Inputs	
Passive reed contact load capacity	12 mA / typical input voltage: 12 or 24 V =
Active signals	Min. 12 mA, max. 24 V
Edge slope	Any
Filter (debouncing)	Digital (5 ms)
Pulse sequence	At least 10 / 10 ms (0/1)
Frequency	Max. 100 Hz
Detection method	Interrupt
Maximum cable length	200 m
Storage of meter readings	Every 15 minutes
Maximum meter reading	9999 9999.9999 99
Smallest resolution	0.000001
Optical pulse display	LED on the PCB

Relay Output	
Relay	1 NO contact, 1 A
Nominal voltage	40 V =/~, no inductive loads

Analog Output	
Value range	0 to 10 V or 0 to 20 mA
Max. output current with 0 to 10 V operation	25 mA
Output voltage with 0 to 20 mA operation	SmartControl power supply
Internal resistance	Voltage measurement: 200 kOhm Current measurement: 249 Ohm
Accuracy	exceeding +- 0.02V
Calibration	+- 0.005V at 10 Volt
Frequency	max. 1Hz
Resolution of AD converter	12 Bit

* Actual power consumption depends upon power pack efficiency, as well as any other connected sensors and devices.

Additional Documentation / Notes

Meter	Date/Time	Reading (kW,m³...)

A/D Transformer

Designation	Unit	Offset	Slope

4. Repair and Replacement Parts Service, Calibration Center and Rental Instrument Service

If required please contact:

GMC-I Service GmbH
Service Center
Thomas-Mann-Str. 20
90471 Nürnberg, Germany
Phone: +49 911 817718-0
Fax: +49 911 817718-253
e-mail: service@gossenmetrawatt.com

This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

5 Product Support

If required please contact:

GMC-I Messtechnik GmbH
Product Support Hotline
Phone: +49 911 8602-500
Fax: +49 911 8602-340
e-mail: support@gossenmetrawatt.com

GOSSEN METRAWATT
GMC-I Messtechnik GmbH
Südwestpark 15
90449 Nürnberg, Germany

Phone: +49 911 8602-111
Fax: +49 911 8602-777
e-mail: info@gossenmetrawatt.com
www.gossenmetrawatt.com